

A Proposed Long term Landscape Habitat and Wildlife Monitoring Program

What do we propose to do?

We intend to monitor habitats to describe the relative abundance and distribution of California Wildlife Habitat Relationships (CWHR) habitat type classifications, including size classes and canopy/cover stages. We will describe ground cover characteristics and measure the relative abundance of 22 CWHR habitat elements and measure the density of 14 additional elements.

On habitat plots, we will measure wildlife using standard techniques including small mammal traps, breeding bird point count surveys, time-area constrained searches for reptiles and amphibians and remote sensing cameras at baited stations. We will attempt to monitor bats using mist net traps and electronic sensing equipment.

What are the project objectives?

This is intended to be a long term project designed to inventory and develop baseline information about the relative abundance of wildlife and habitats. We propose to return to sample plots over time to assess trends in habitat conditions and wildlife populations while continuing to increase the distribution of survey plots at unsampled sites. Information gathered is intended to help guide Department personnel in meeting our regulatory responsibility to protect wildlife and habitat.

What do we want to know about habitat?

- What are the relative distributions of CWHR habitat types, size classes and canopy classes?
- How abundant are CWHR habitat elements and how are they distributed on the landscape ?
- What are the trends in habitat types, size and cover classes and how are vegetative habitat elements changing?

What do we want to know about wildlife?

- What is the relative abundance of the wildlife species being monitored?
- What are the trends in wildlife populations being monitored?
- How are wildlife distributed across the landscape (species distributions)?

What is the proposed sample universe?

The initial study is proposed for the Southern Cascade Ecological Province as defined in "Ecological Units of California" -August 1994. US Department of Agriculture, Forest Service and Natural Resource Conservation Service. The Province is approximately 6.4 million acres and consists of 15 ecologically distinct sub units. Following an assessment of study procedures and results in this initial area, decisions will be made about expansion of the program to other ecological areas of the State.

What is the sampling strategy?

Two hundred sample points have been selected from intersections of a 3 mile grid established over the sample universe (Figure 1.) The sample will be distributed proportionately throughout the subunits based on acreage (Table 1). Coordinates for randomly selected grid intersects will be uploaded to GPS units for field location. Plots will be marked for return surveys.

We have tentatively planned to return to plots every fifth year for habitat change analysis. This interval may change based on experience. In order to monitor trends in wildlife, some portion of each years plots will be surveyed annually. Two monitoring objectives are somewhat conflicting. We hope to develop indexes to population trends for wildlife species while also gaining an understanding of species distribution. This will require repeating plots annually but also increasing the spatial distribution of surveyed grid intersects. In order to achieve these goals, we are considering selecting one-half of our annual sample from plots already surveyed and half from unselected points.

What is the sample unit?

The sample unit consists of a four-plot grid (Figure 2). One grid consisting of four, 50 meter radius plots will be surveyed at each selected 3 mile grid intercept. This plot configuration was chosen because it is similar to sample plots used in established protocols for breeding bird surveys and can be adapted to protocols for other guilds of wildlife species. The plot design is used by the US Forest Service as part of an established forest inventory process. The grid is considered the sample unit.

What information do we collect at each plot grid?

Habitat information:

- In wooded habitats (tree canopy > 10%), we will record tree species, diameter at breast height, canopy closure (% crown canopy cover) and ground cover. Crown canopy is measured with site tube as a "hit" or "miss". (Tables 2 and 3).

- In non-wooded habitats (<10% tree canopy), we record shrubs, forbs and grasses according to height and age classes.
- These data allow classification to WHR habitat type, size class and canopy closure class.
- We will record the presence or absence of 36 WHR vegetative habitat elements. We hope to monitor trends in these elements based on percent of sample grids with elements measured over time (Table 2).
- The number of logs, snags and stumps in a 25 meter radius area in each plot at each grid. will be counted. We hope to estimate absolute density of these elements at a landscape level e.g. ecological unit or watershed. (Table 3).
- We will record the dominant ground cover in a four inch diameter circle at each sample point (rock, bare, litter, duff, grass, forb).

Wildlife information:

- Sixty four small mammal traps will be set at each plot grid (16 in each plot). Results will be assessed as number of species captured per trap night.
- Breeding bird surveys will be conducted using electronic recording equipment to record singing males. We will analyze the presence or absence of species per unit of recording effort.
- Cameras, triggered by motion, will be set (one per sample grid) focused on attractant bait. Each species photographed per plot sampled per year will provide a relative abundance index.
- Time and area constrained searches for reptiles and amphibians will be conducted on three of the four (random selection of plots A, C and D) grid plots. Results will provide a relative abundance index.

What is the sampling procedure at a single sample unit (four plot grid)?

Habitat analysis:

Twenty five, random points were selected for each of the four plots (A,B,C,D) in each grid (Figure 3). Each of the four plots has unique points. Point locations are repeated for each grid. A "route" was developed for each plot. The observer begins at plot center and follows a fixed bearing and distance to each successive point. At each point, ground cover is recorded, a site tube reading for tree canopy (hit or miss) is taken and the diameter at breast height (dbh) is measured at the nearest tree greater than five inches dbh. The tree species of the nearest tree is also recorded. One hundred points are surveyed for each sample grid.

During this process, observers note occurrence of any of the listed habitat elements. When the sample point route is complete, all snags, logs and stumps are counted in each plot by an observer circling the center of the plot counting element occurrence to a recorder stationed at the plot center. The twenty-five meter radius is measured using a laser rangefinder when distance to the center is in question.

Wildlife surveys:

Small mammals:

Traps are set in four, four-trap grids per plot. Sixty-four traps sample the grid (Figure 4). Trap locations were determined by drawing plots to scale on 5 meter grid paper. Plots were stratified by quadrant and a random point was selected in each quadrant of each of the four plots. From each of the initial four points, the other three points in each grid were determined by randomly selecting a cardinal direction. Trap grid locations are determined on the ground by following a standard bearing and distance from plot center.

Bats:

Bats will be captured in mist nets. One net will be set in the nearest appropriate location to the center point of each of the plots in a grid.

Breeding bird surveys:

An electronic recording device with an omnidirectional microphone will be placed at the center of plot A (grid center). Timers will be used to control the time of day/night and duration of recording period. We plan to place multiple recording units at several plots and record bird vocalizations simultaneously to reduce potential variability in time and weather.

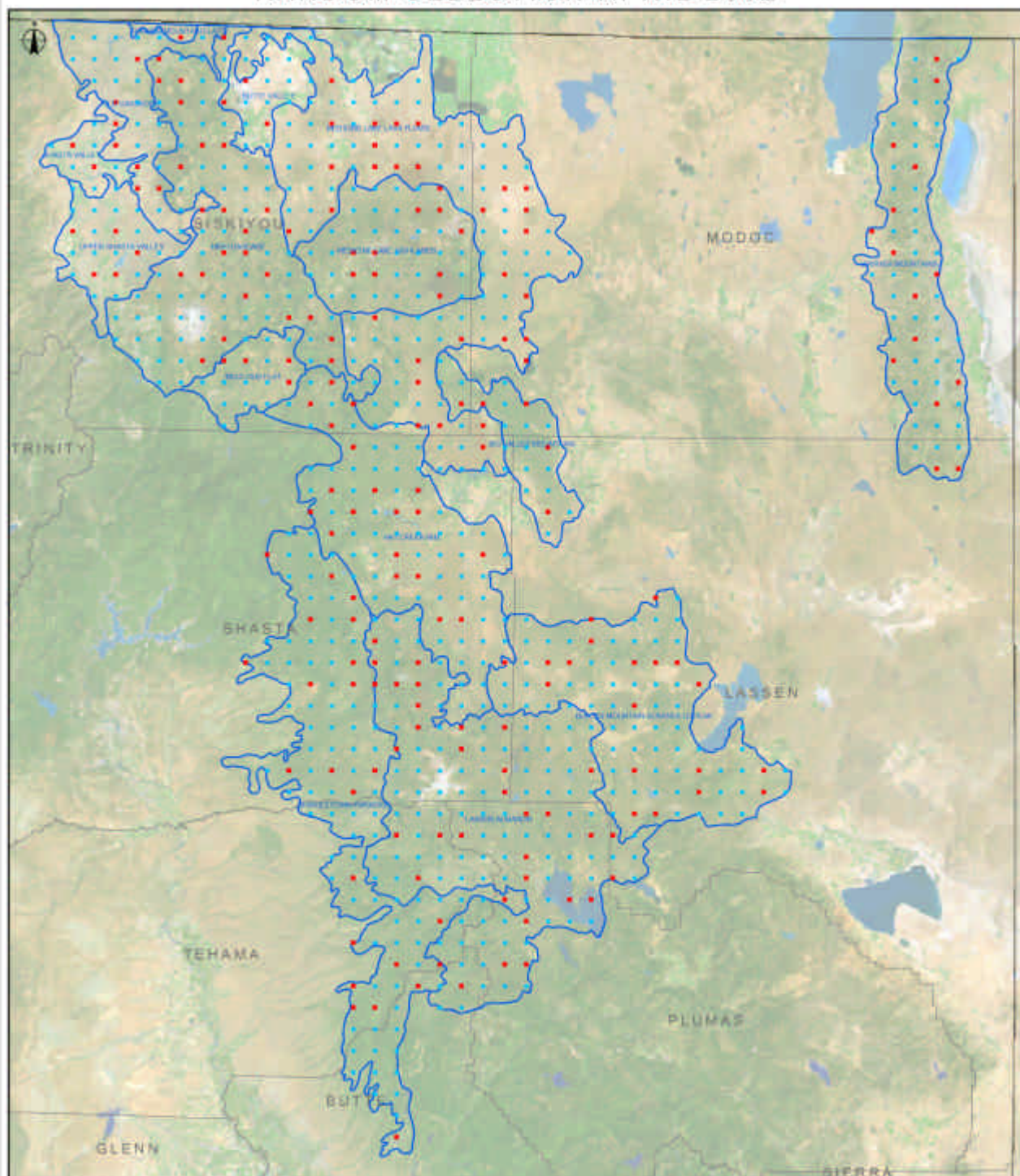
Baited cameras:

Motion triggered cameras will be set up at a point nearest the center of plot A depending on site conditions. Exact locations depend on the availability of suitable trees to attach the camera and bait.

Reptile and amphibian sampling:

Time and area constrained searches are most often used to monitor herptofauna. The area of three, 50 meter radius circles is approximately the same as a commonly used sampling protocol. We selected three of the four plots from a sample grid, plots A, C and D at random. These plots will be searched at each four plot grid.

FOREST SAMPLING GRID RANDOM SELECTION APRIL 2002



3 Mile Grid Points

- Not Selected
- Randomly Selected
- Sub-Region Boundary

0 4 8 16 24 32 40 Miles

NCNCR Information Services Branch
April 2002

Figure 2. Four point sampling grid

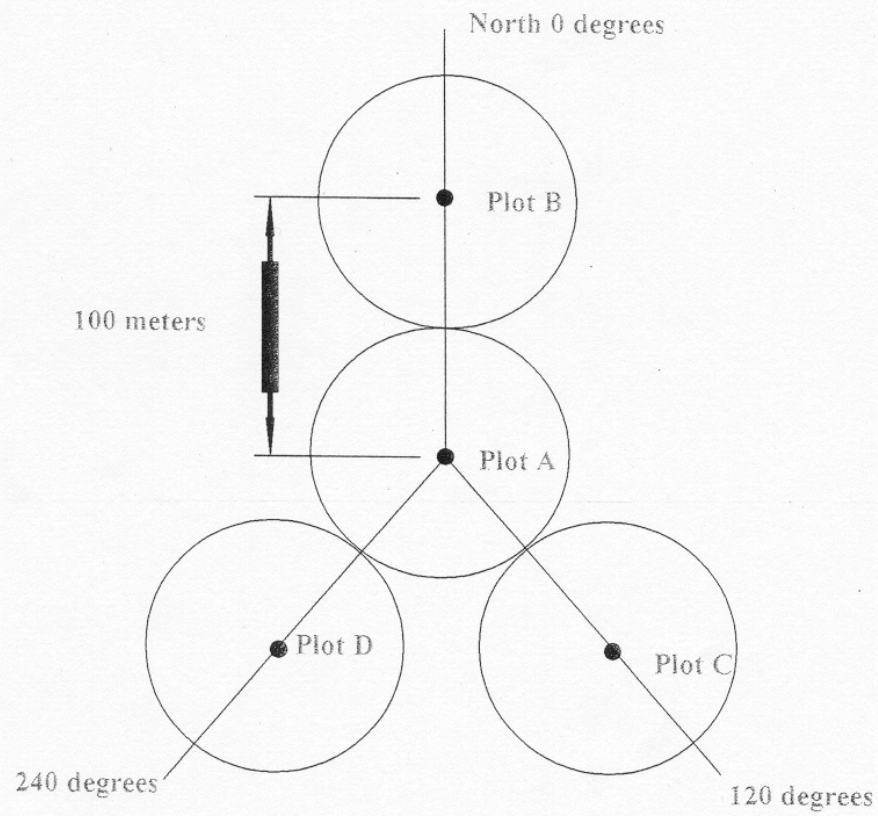


Figure 3. Random points for WHR data - Plot A

Twenty five independant random points are surveyed for WHR analysis.
Each plot (A, B, C and D) have unique survey transects.

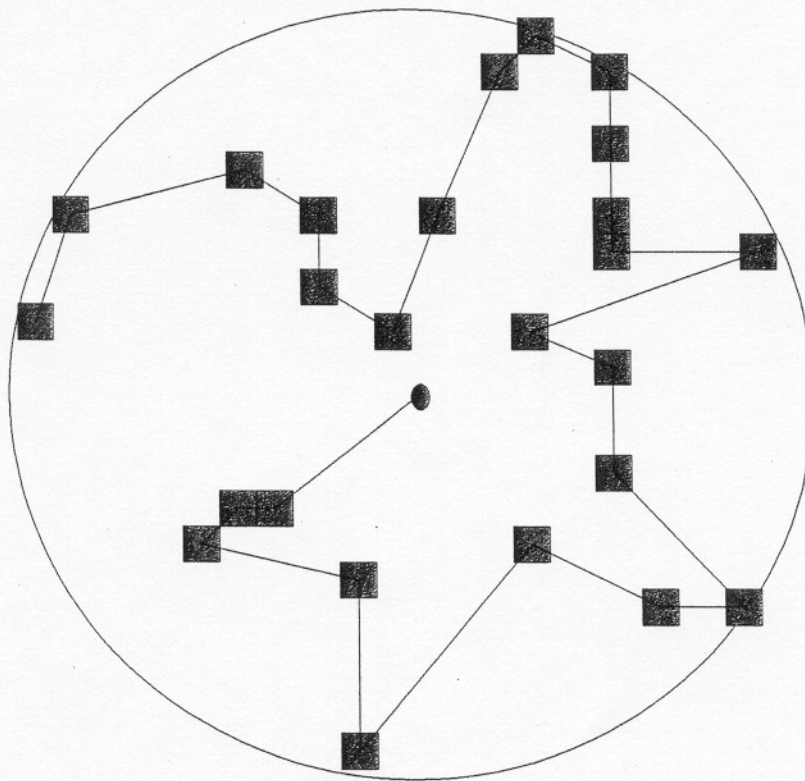


Figure 4. Small mammal trap locations

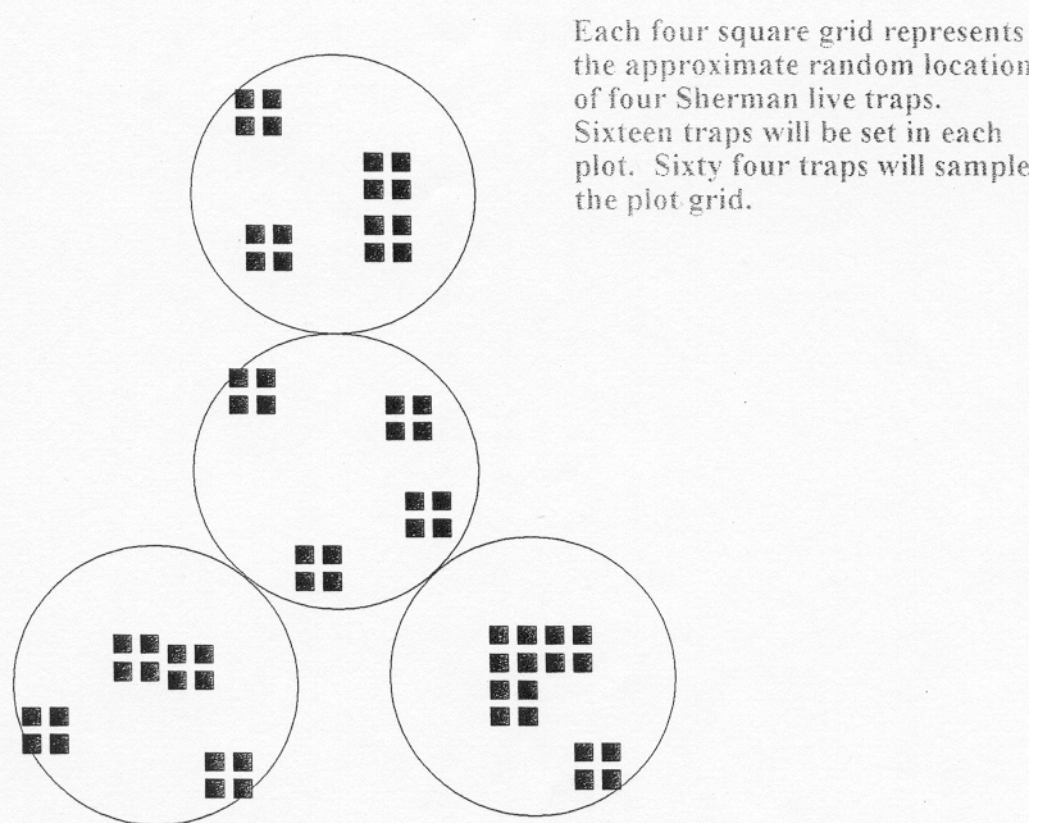


Table 1: Distribution of sample points by proportional allocation to ecological sub units.

SUB_NAME	ACREAGE	PERCENT OF TOTAL AREA	SAMPLE	# OF POINTS FROM 3 MILE GRID TO SAMPLE FROM
OLD CASCADES	172353	3.74	7	26
PARKER MOUNTAIN FLATS	9662	0.21	0	1
HIGH CASCADE	495964	10.76	22	87
MEDICINE LAKE LAVA FLOWS	690377	14.97	30	119
BUTTE VALLEY	75981	1.65	3	17
SHASTA VALLEY	52596	1.14	2	9
MEDICINE LAKE HIGHLANDS	238642	5.18	10	40
UPPER SHASTA VALLEY	125457	2.72	5	23
MCCLOUD FLAT	83559	1.81	4	16
BIG VALLEY MOUNTAINS	118449	2.57	5	21
HAT CREEK RIM	444720	9.64	19	75
SHINGLETOWN-PARADISE	563858	12.22	24	99
BLACKS MOUNTAIN-SUSANVILLE PEAK	443880	9.63	19	79
LASSEN-ALMANOR	745093	16.16	32	136
WARNER MOUNTAINS	350653	7.60	15	59
	4611246	100.00	200	

TABLE 2. Example of data gathered at one plot in a four-plot sample grid.

California Wildlife Habitat Relationships Data Sheet

Wooded Habitat Data Sheet

Year: 01 Month: 11 Day: 1
Observers: Hill

Plot Grid Number: 7267

Plot A

Data Recorder: Croteau

Point	Tree sp.	dbh	over/under	gnd cover	Layer	Site Tube (1,0)	Bearing	Distance
1	PIPO	15		duff		1	225	24
2	PIPO	15		duff		0	270	5
3	PIPO	13		duff		0	225	7
4	PIPO	19		SS		0	101	17
5	PIPO	20		SS		1	180	20
6	PIPO	7		CEPR		0	38	37
7	PIPO	7		LS	S-1 (manz)	1	122	17
8	PIPO	8		duff		1	90	10
9	PIPO	16		duff		1	322	26
10	PIPO	19		duff		1	0	15
11	PIPO	14		duff		1	297	12
12	PIPO	8		duff		0	74	32
13	PIPO	10		duff		0	270	20
14	PIPO	23		duff		1	0	5
15	PIPO	9		duff		0	0	10
16	PIPO	14		duff		0	0	10
17	ABCO	14		bare		0	299	12
18	PIPO	6		rock		0	221	7
19	PIPO	12		duff		1	194	21
20	PIPO	15		duff		0	200	16
21	PIPO	10		SS		0	296	12
22	PIPO	12		duff		0	0	10
23	PIPO	7		duff		0	296	12
24	PIPO	6		duff		1	253	22
25	PIPO	15		CEPR		0	196	16
Mean		12.56				0.4		
SD		4.73				0.50		

CWHR Habitat Element Checklist

	Observed	Not Observed	No. observed
Acorns		x	
Aquatic emergent		x	
Aquatics submerged		x	
Cones from gymnosperm trees	x		Log, large (hollow) >20" diameter 0
Forbs- herbaceous dictyledons	x		Log, large (rotten) >20" diameter 0
Graminoids	x		Log, large (sound) >20" diameter 1
Grass/agriculture			Log, medium (hollow) 10-20" diameter 0
Grass/water interface			Log, medium (rotten) 10-20" diameter 3
Layer, herbaceous>10% understory	x		Log, medium (sound) 10-20" diameter 5
Layer, shrub>10% understory			Snag, large (rotten) >30"dbh 0
Layer, tree>10% subcanopy trees	x		Snag, large (sound) >30"dbh 0
Litter-residue<1" diameter	x		Snag, medium (rotten) 15-30"dbh 0
Moss-bryophytes	x		Snag, medium (sound) 15-30"dbh 0
Shrub/agriculture interface			Snag, small (rotten) <15"dbh 0
Shrub/grass interface			Snag, small (sound) <15"dbh 0
Shrub/water interface			Stump (rotten) snag <10 feet high 2
Shrubs- woody plants, not trees	x		Stump (sound) snag <10 feet high 9
Slash, large (rotten) residue 3-10" diameter	x		Water, any source of free water 0
Slash, large (hollow) residue 3-10" diameter		x	
Slash, large (sound) residue 3-10" diameter	x		
Slash, small, residue 1-3" diameter	x		
Tree, broken live top> 11" diameter		x	
Tree, with cavity		x	
Tree, with loose bark		x	

**Table 3: Summary of habitat data gathered
on all four plots of a sample grid.**

Summary Data

Plot Grid Number: 7267 Type PPN Size 4 Class S

Mean for Each Plot

Plot:	A	B	C	D	Mean
dbh:	12.56	10.64	12.24	11.16	11.65
canopy closure:	0.4	0.08	0.4	0.04	0.23

occurrences

Tree Species	A	B	C	D	Total	Mean	% Occurrence
PIPO	24	18	25	18	85	21.25	85
ABCO	1	6	0	3	10	2.5	10
JUOC	0	1	0	4	5	1.25	5

occurrences

Ground Cover Type	A	B	C	D	Total	Mean	% Occurrence
Duff	17	10	17	2	46	11.5	46
Bare	1	3	1	6	11	2.75	11
Rock	1	1	1	5	8	2	8
SS	3	2	2	3	10	2.5	10
LS	1	2	2	2	7	1.75	7
LM	0	0	0	0	0	0	0
LL	0	0	0	0	0	0	0
CEPR	2	4	2	1	9	2.25	9
PNG	0	1	0	2	7	0.75	7
Forb	0	0	0	0	2	0	2
					100		

CWHR Habitat Element Checklist

Plots containing Element

Acorns	0
Aquatic emergent	0
Aquatics submerged	0
Cones from gymnosperm trees	4
Forbs- herbaceous dictyledons	4
Graminoids	4
Layer, herbaceous>10% understory	3
Layer, shrub>10% understory	1
Layer, tree>10% subcanopy trees	2
Litter-residue<1" diameter	4
Moss-bryophytes	4
Shrubs- woody plants, not trees	4
Slash, large (rotten) residue 3-10" diameter	4
Slash, large (hollow) residue 3-10" diameter	3
Slash, large (sound) residue 3-10" diameter	3
Slash, small, residue 1-3" diameter	3
Tree, broken live top> 11" diameter	2
Tree, with cavity	2
Tree, with loose bark	1
Trees, fir>11" dbh	3
Trees, hardwood> 11" dbh	0
Trees, pine> 11" dbh	4

	A	B	C	D	Total	Mean
Log, large (hollow) >20" diameter	0	0	0	0	0	0
Log, large (rotten) >20" diameter	0	0	0	1	1	0.25
Log, large (sound) >20" diameter	1	0	0	0	1	0.25
Log, medium (hollow) 10-20" diameter	0	0	0	0	0	0
Log, medium (rotten) 10-20" diameter	3	0	1	3	7	1.75
Log, medium (sound) 10-20" diameter	5	14	13	0	32	8
Snag, large (rotten) >30" dbh	0	0	0	0	0	0
Snag, large (sound) >30" dbh	0	0	0	0	0	0
Snag, medium (rotten) 15-30" dbh	0	0	0	0	0	0
Snag, medium (sound) 15-30" dbh	0	0	0	1	1	0.25
Snag, small (rotten) <15" dbh	0	0	0	0	0	0
Snag, small (sound) <15" dbh	0	0	0	0	0	0
Stump (rotten) snag <10 feet high	2	0	0	1	3	0.75
Stump (sound) snag <10 feet high	9	21	12	19	61	15.25
Water, any source of free water	0	0	0	0	0	0